INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 2000	**Park:** Shenandoah NP
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Permit#:
N-257

Park-assigned Study Id. #:
unknown

Project Title:
THE STUDY OF THE CHANGES IN WATER QUALITY OF SHENANDOAH NATIONAL PARK STREAMS

Permit Start Date: Jan 01, 2000	**Permit Expiration Date** Dec 31, 2000
Study Start Date: Jan 01, 2000	**Study End Date** Dec 31, 2000

Study Status:
Completed

Activity Type:
Monitoring

Subject/Discipline:
Monitor Natural Resources

Objectives:
To compare water quality data provided by Park with current data taken in 2000-2001

Findings and Status:

The data obtained from this experiment accepted the null hypothesis that there has been no substantial change in water quality in Shenandoah National Park streams since 1993. The three streams tested during this research were Piney Run, Staunton River, and Paine Run. These streams were all unique in their characteristics and in the life they contain.

Piney Run is a small mountain freestone stream in the northeastern portion of Shenandoah National Park. The streambed consists of gravel-sized stones with few rocks larger than 25cm in diameter. The stream"s abundance in aquatic insects accounts for it"s healthy brook trout population. The banks of Piney Run are lined with a dense growth of trees.

Staunton River is also mountain freestone stream. Located in the central-eastern portion of the park, Staunton River"s streambed consists of large boulder-sized rocks and some rocks as large as a small house. Several years ago, a massive flood devastated the area sround Staunton River. The stream was redirected and an old streambed can be found a few yards from the current streambed. The Staunton River is a tributary of the Rapidan River, a famous eastern trout stream. Unlike Piney, only short brush and shrubs line the banks of the Staunton River. This could be because the powerful floods washed away most of the trees on the banks.

Paine Run is a unique stream. It is located in southwestern portion of the park and unlike Piney and Staunton, Paine Run has bery few rocks on the streambed. Instead, Paine seems to be carved out of one large solid rock that serves as a smooth streambed. This could be a possible factor contributing to the fact that there are few macroinvertebrates presnet in the stream. This would account for hte poor population of brook trout. Paine Run is lined with dense woods. This stream was much less accessible than Piney and Staunton and the paths seemed to be less traveled.

The results show that there was no significant change temperature and dissolved oxygen through the years. This is not surprising because temperature and dissolved oxygen are closely linked. In order for the stream temperature to rise, there must be severe physical changes to the stream such as deforestation or major defoliation. Defoliation may be the reason for a slight chang in pH. Gypsy moths can quickly defoliate an oak, leaving messy leaf litter to fall in the stream and decay. This leaf decay can cause the water to turn slightly acidic. Despite the drop in pH, the macroinvertebrate population was not significantly affected. This goes to show that pH alone is not responsible for fluctuations in macroinvertebrate population. The nitrate levels from 1993 to 1995 range from small amounts to large quantities. The nitrate levels that were recorded in 2000 were all 0 ppm. This could mean one of two things; one, there really are not any nitrates in the stream or, two, the instruments were not accurate enough to measure small quantities of chemicals. The latter possibility is what most likely happened in this situation. Shenandoah National Park uses high tech meters as opposed to inexpensive test strips. In conclusion, the water quality of Shenandoah National Park streams has not significantly changed since the Park"s data was collected in 1993, 1994 and 1995, thus accepting my null hypothesis.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?

No

Funding provided this reporting year by NPS:	**Funding provided this reporting year by other sources:**
0	0

Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college

Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
N/A	0